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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEURIG, SHARLENE L	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/043,849	WEAVER ET AL.	
	Examiner	Art Unit	
	Sharlene Leurig	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. In view of the Appeal Brief filed on February 7, 2005, PROSECUTION IS HEREBY REOPENED. A new non-final rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

2. Applicant's arguments, see the Appeal Brief, filed February 7, 2005, with respect to the rejection(s)of claim(s) 2-31 under 35 U.S.C. 103(a) as being unpatentable over Affinito (6,268,695) in view of Duggal et al. (US 2001/0033135 A1) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Affinito (6,268,695) in view of Hora (5,936,345).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-18, 21-23 and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affinito (6,268,695) (of record) in view of Hora (5,936,345).

Regarding claim 10, Affinito discloses an organic light-emitting device comprising a substrate (Figure 2, element 150), an active region (160) positioned over the substrate, the active region comprising an anode layer, a cathode layer and a light-emitting layer disposed between the anode and the cathode (column 4, lines 30-40), and one or more composite barrier layers disposed over and under the active region, the composite barrier layers composed of an alternating series of one or more polymeric planarizing sublayers (132, 136) and one or more high-density sublayers (134, 144).

Affinito lacks disclosure of any of the polymeric planarizing sublayers containing microparticles that increase the out-coupling efficiency of the OLED.

Hora teaches that microparticles of barium titanate (column 7, line 31) embedded in a polymeric planarizing layer (9) formed on an OLED provides a reflective insulating layer (column 7, lines 25-34). The layer taught by Hora can be considered to be a planarizing layer since it is perfectly even and uniform in thickness (column 8, line 10). It has been held that the recitation that an element is "effective to" perform a function is

not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. One skilled in the art would recognize that reflective particles in the insulating layer are capable of increasing the out-coupling efficiency of the device by redirecting photons emitted by the EL layer (3) toward the emissive display side of the device.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED disclosed by Affinito to have microparticles formed in a polymeric planarizing sublayer, as taught by Hora, in the composite barrier layer, either above or below the active region, in order to increase the amount of photons exiting the device and to thereby improve the device's efficiency while providing a planarizing layer.

Regarding claim 2, Affinito discloses a substrate comprised of an inorganic material or an organic material (column 3, lines 45-50).

Regarding claim 3, Affinito discloses a preference for the layers beneath the active region to be transparent, and therefore discloses a transparent substrate (column 3, lines 23-25).

Regarding claim 4, Affinito discloses that the substrate may comprise metal (column 3, lines 46-49) and that substrates may be constructed of glass (column 1, line 20).

Regarding claims 5 and 6, Affinito discloses a substrate comprising a polymeric material that can be flexible (column 3, lines 45-48).

Regarding claim 7, Affinito discloses a substrate formed of polyethyleneterephthalate (PET), which is a type of polyester (column 3, line 49).

Regarding claim 8, the polymer layers (132, 136, 142) disclosed by Affinito that may contain microparticles, as taught by Hora, is formed on a top surface of the substrate (150).

Regarding claims 9 and 12, Affinito discloses that the substrate may be made of a transparent flexible polymeric material (column 3, lines 45-48) and that substrates may be constructed of glass (column 1, line 20).

Regarding claim 11, Affinito discloses a composite barrier layer (130 and 140) formed on a top surface of the substrate (150).

Regarding claim 13, Affinito discloses a composite barrier layer (130, 140) comprising an alternating series of two or more polymeric planarizing sublayers (132, 136) and two or more high-density sublayers (144, 134).

Regarding claim 14, Affinito discloses a composite barrier layer (130, 140) that can be disposed over the active region (160).

Regarding claim 15, Hora teaches microparticles formed in a polymeric planarizing sublayer, as discussed above, but lacks disclosure of multiple polymeric planarizing sublayers containing microparticles.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to include microparticles in more than one of the polymeric planarizing sublayers disclosed by Affinito, since it has been held that mere duplication of the

essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.,* 193 USPQ 8.

Therefore regarding claim 15, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Hora, in order to increase the efficiency of the device, and to further modify it to have microparticles in more than one of the polymeric planarizing sublayers in order to increase the amount of scattered light and thereby further increase the efficiency of the device.

Regarding claim 16, one of the polymer layers (142) disclosed by Affinito that may contain microparticles, as taught by Hora, is closest to the substrate (150).

Regarding claim 17, one of the polymer layers (136) disclosed by Affinito that may contain microparticles, as taught by Hora, is formed on the substrate (150) and closest to the active region (160).

Regarding claim 18, Affinito discloses a composite barrier layer (130, 140) disposed over the active region (160). Therefore one of the polymer layers disclosed by Affinito that may contain microparticles, as taught by Hora, is formed over the active region (160).

Regarding claims 11 and 16-18, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the microparticles taught by Hora in any of the polymer layers disclosed by Affinito, since it has been held that rearranging the parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

Therefore regarding claims 11 and 16-18, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Hora, in order to increase the efficiency of the device, and to further modify it to have microparticles formed in any one of the polymeric planarizing sublayers to modify the device to have light emission in a particular direction, as it has been held to be within routine skill in the art to change the arrangement of parts of a device.

Regarding claims 21-23 and 25, Affinito lacks mircroparticles in the polymer layer.

Regarding claim 21, the microparticles taught by Hora comprise a transparent inorganic material, as they are formed of barium titanate (column 7, line 31). Though Hora teaches the barium titanate to form a reflective layer in conjunction with its resin matrix, the microparticles themselves can be considered to be transparent as they are not perfectly reflective. Barium titanate, regardless of whether in a uniform layer or in the shape of individual particles, has an index of refraction, which can be found in the references made of record accompanying this action. Refraction is the bending of the normal to the wavefront of a propagating wave upon passing from one medium to another where the propagation velocity is different. Therefore for a material to have an index of refraction it must be at least partially transparent to light.

Regarding claim 22, Hora teaches microparticles comprised of glass, such as $BaTiO_3$, which is a glass (column 7, line 31).

Regarding claim 23, Hora teaches microparticles comprising metal oxide such as $BaTiO_3$ (column 7, line 31).

Regarding claim 25, Hora teaches microparticles of barium titanate, which has an index of refraction ranging from roughly 1.7 to more than 2.5 (see references of record), and therefore teaches microparticles having an index of refraction within the claimed range.

Therefore regarding claims 21-23 and 25, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the polymeric planarizing sublayers of Affinito to have microparticles made of a transparent material such as glass of a metal oxide such as barium titanate, as taught by Hora, in order to increase the efficiency of the device.

Regarding claims 26 and 27, Affinito teaches that the polymeric planarizing sublayers may be comprised of a polymer, and uses the open-ended example of polyethylenephthalate (PET) (column 3, lines 45-48), which has an index of refraction of around 1.5 (see references made of record below).

Affinito fails to exemplify microparticles in the planarizing layer.

Hora teaches incorporating microparticles of barium titanate, which has an index of refraction of anywhere from 1.7 to more than 2.5 (see references made of record below, in a planarizing layer of a different refractive index, such as fluorine resins or cellulose resins, which have indices of refraction of around 1.5 (see references made of record below), to increase the efficiency of the device.

Therefore regarding claims 26 and 27, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Hora, in order to increase the efficiency of the device, and to thereby provide microparticles having a different index of refraction than that of the polymeric sublayer, wherein the difference in the indices of refraction is greater than about 0.3.

Regarding claim 28, Affinito discloses a variety of planarizing sublayer materials, but fails to exemplify fluorinated polymers.

Regarding claim 28, the polymeric planarizing sublayer taught by Hora may be formed of fluorinated polymers (column 7, lines 29-32).

Therefore regarding claim 28, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Hora, in order to increase the efficiency of the device, and to further modify it to have the planarizing layer formed of a fluorinated polymer, as taught by Hora, in order to provide a smooth and even layer compatible with the encased microparticles.

Regarding claim 29, Affinito discloses a high-density material of a metal oxide, metal nitride, metal carbide or metal oxynitride (column 3, lines 54-65).

Regarding claim 30, Affinito discloses a high-density material of silicon oxide, silicon nitride, silicon carbide, silicon oxynitride, indium oxide, indium tin oxide, aluminum oxide, aluminum nitride or titanium oxide (column 3, lines 54-65).

Regarding claim 31, Affinito discloses composite barrier layers formed both over and under the active region (160).

Affinito fails to exemplify microparticles formed in the composite barrier layers both under and over the active region.

Hora teaches microparticles formed in a polymer planarizing layer in order to improve the device efficiency.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include microparticles in more than one of the polymeric planarizing sublayers disclosed by Affinito, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.,* 193 USPQ 8.

Therefore regarding claim 31, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Hora, in order to increase the efficiency of the device, and to further modify it to have microparticles in more than one of the polymeric planarizing sublayers, including composite barrier layers over and under the active region, in order to increase the amount of scattered light and thereby further increase the efficiency of the device.

5. Claims 2-18, 21-27 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affinito (6,268,695) (of record) in view of Haluska et al. (4,849,296).

Regarding claim 10, Affinito discloses an organic light-emitting device comprising a substrate (Figure 2, element 150), an active region (160) positioned over the substrate, the active region comprising an anode layer, a cathode layer and a light-emitting layer disposed between the anode and the cathode (column 4, lines 30-40), and one or more composite barrier layers disposed over and under the active region, the composite barrier layers composed of an alternating series of one or more polymeric planarizing sublayers (132, 136) and one or more high-density sublayers (134, 144).

Affinito lacks disclosure of any of the polymeric planarizing sublayers containing microparticles that increase the out-coupling efficiency of the OLED.

Haluska teaches that microparticles of titanium dioxide (Abstract) embedded in a polymeric planarizing layer of resin (Abstract) may be used as planarizing layers for electronic devices (Abstract). It has been held that the recitation that an element is "effective to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. The planarizing layer of Haluska contains the same material disclosed by the applicant as being capable of increasing the out-coupling efficiency of an OLED, namely titanium dioxide. Therefore the titanium dioxide microparticles taught by Haluska are capable of increasing the out-coupling efficiency of an OLED.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED disclosed by Affinito to have microparticles formed in a polymeric planarizing sublayer in the composite barrier layer, either above or below

the active region, in order to provide good protection of the electronic components while also providing a planarizing layer, as taught by Haluska.

Regarding claim 2, Affinito discloses a substrate comprised of an inorganic material or an organic material (column 3, lines 45-50).

Regarding claim 3, Affinito discloses a preference for the layers beneath the active region to be transparent, and therefore discloses a transparent substrate (column 3, lines 23-25).

Regarding claim 4, Affinito discloses that the substrate may comprise metal (column 3, lines 46-49) and that substrates may be constructed of glass (column 1, line 20).

Regarding claims 5 and 6, Affinito discloses a substrate comprising a polymeric material that can be flexible (column 3, lines 45-48).

Regarding claim 7, Affinito discloses a substrate formed of polyethyleneterephthalate (PET), which is a type of polyester (column 3, line 49).

Regarding claim 8, the polymer layers (132, 136, 142) disclosed by Affinito that may contain microparticles, as taught by Haluska, is formed on a top surface of the substrate (150).

Regarding claims 9 and 12, Affinito discloses that the substrate may be made of a transparent flexible polymeric material (column 3, lines 45-48) and that substrates may be constructed of glass (column 1, line 20).

Regarding claim 11, Affinito discloses a composite barrier layer (130 and 140) formed on a top surface of the substrate (150).

Regarding claim 13, Affinito discloses a composite barrier layer (130, 140) comprising an alternating series of two or more polymeric planarizing sublayers (132, 136) and two or more high-density sublayers (144, 134).

Regarding claim 14, Affinito discloses a composite barrier layer (130, 140) that can be disposed over the active region (160).

Regarding claim 15, Haluska teaches microparticles formed in a polymeric planarizing sublayer, as discussed above, but lacks disclosure of multiple polymeric planarizing sublayers containing microparticles.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to include microparticles in more than one of the polymeric planarizing sublayers disclosed by Affinito, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.,* 193 USPQ 8.

Therefore regarding claim 15, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Haluska, in order to protect the electronic device, and to further modify it to have microparticles in more than one of the polymeric planarizing sublayers in order to increase the amount of scattered light and thereby further improve the protection of the device.

Regarding claim 16, one of the polymer layers (142) disclosed by Affinito that may contain microparticles, as taught by Haluska, is closest to the substrate (150).

Regarding claim 17, one of the polymer layers (136) disclosed by Affinito that may contain microparticles, as taught by Haluska, is formed on the substrate (150) and closest to the active region (160).

Regarding claim 18, Affinito discloses a composite barrier layer (130, 140) disposed over the active region (160). Therefore one of the polymer layers disclosed by Affinito that may contain microparticles, as taught by Haluska, is formed over the active region (160).

Regarding claims 11 and 16-18, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the microparticles taught by Haluska in any of the polymer layers disclosed by Affinito, since it has been held that rearranging the parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

Therefore regarding claims 11 and 16-18, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Haluska, in order to protect the electronic device, and to further modify it to have microparticles formed in any one of the polymeric planarizing sublayers to modify the device to have light emission in a particular direction, as it has been held to be within routine skill in the art to change the arrangement of parts of a device.

Regarding claims 21-23 and 25, Affinito lacks mircroparticles in the polymer layer.

Regarding claim 21, the microparticles taught by Haluska comprise a transparent inorganic material, as they are formed of titanium dioxide (column 5, Table I). Titanium dioxide has an index of refraction, which can be found in the references made of record accompanying this action. Refraction is the bending of the normal to the wavefront of a propagating wave upon passing from one medium to another where the propagation velocity is different. Therefore for a material to have an index of refraction it must be at least partially transparent to light.

Regarding claim 22, Haluska teaches microparticles comprised of glass, such as TiO_2, which is a glass.

Regarding claim 23, Haluska teaches microparticles comprising metal oxide such as TiO_2.

Regarding claim 23, Haluska teaches microparticles of titanium dioxide.

Regarding claim 25, Haluska teaches microparticles of titanium dioxide, which has an index of refraction of around 2.6 (see references of record), and therefore teaches microparticles having an index of refraction within the claimed range.

Therefore regarding claims 21-23 and 25, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the polymeric planarizing sublayers of Affinito to have microparticles made of a transparent material such as glass of a metal oxide such as titanium dioxide, as taught by Haluska, in order to protect the electronic device.

Regarding claims 26 and 27, Affinito teaches that the polymeric planarizing sublayers may be comprised of a polymer, and uses the open-ended example of

polyethylenephthalate (PET) (column 3, lines 45-48), which has an index of refraction of around 1.5 (see references made of record below).

Affinito fails to exemplify microparticles in the planarizing layer.

Haluska teaches incorporating microparticles of titanium dioxide, which has an index of refraction of around 2.6 (see references made of record below) to protect the electronic device.

Therefore regarding claims 26 and 27, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Haluska, in order to protect the device, and to thereby provide microparticles having a different index of refraction than that of the polymeric sublayer, wherein the difference in the indices of refraction is greater than about 0.3.

Regarding claim 29, Affinito discloses a high-density material of a metal oxide, metal nitride, metal carbide or metal oxynitride (column 3, lines 54-65).

Regarding claim 30, Affinito discloses a high-density material of silicon oxide, silicon nitride, silicon carbide, silicon oxynitride, indium oxide, indium tin oxide, aluminum oxide, aluminum nitride or titanium oxide (column 3, lines 54-65).

Regarding claim 31, Affinito discloses composite barrier layers formed both over and under the active region (160).

Affinito fails to exemplify microparticles formed in the composite barrier layers both under and over the active region.

Haluska teaches microparticles formed in a polymer planarizing layer in order to protect the device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include microparticles in more than one of the polymeric planarizing sublayers disclosed by Affinito, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.,* 193 USPQ 8.

Therefore regarding claim 31, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED of Affinito by including microparticles in the polymeric planarizing sublayer, as taught by Haluska, in order to protect the device, and to further modify it to have microparticles in more than one of the polymeric planarizing sublayers, including composite barrier layers over and under the active region, in order to further increase protection of the device.

6. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affinito (6,268,695) (of record) in view of Hora (5,936,345) as applied to claims 2-18, 21-23 and 25-31 above, further in view of Harper et al. (4,816,717) and further in view of Fork (6,339,289) (of record).

Affinito discloses an OLED having an active region (160) and a composite barrier layer having high-density sublayers and polymeric planarizing sublayers to shield the device from moisture and oxygen.

Affinito lacks disclosure of microparticles formed within the polymeric planarizing sublayers.

Hora teaches that microparticles of barium titanate (column 7, line 31) embedded in a polymeric planarizing layer (9) formed on an OLED provides a reflective insulating layer (column 7, lines 25-34).

Hora fails to exemplify the size of the barium titanate particles in the planarizing layer.

Harper teaches an EL device having a dielectric layer containing particles of barium titanate less than 5 microns in diameter (column 3, lines 30-32).

Affinito, Hora and Harper lack disclosure of the pixel size of the OLED.

Fork teaches an OLED with pixels that are 300 microns across (column 5, line 9) as part of an OLED designed to prevent dark spots and thereby improve imaging.

Regarding claim 19, when such a pixel size taught by Fork is combined with the microparticle size taught by Harper, the microparticles are smaller than the smallest lateral dimension of the pixel combination.

Regarding claim 20, the pixel size taught by Fork fits within the claimed pixel size range of 10 microns to 300 microns, and the microparticle size taught by Harper fits within the claimed microparticle size range of 0.4 microns to 10 microns.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED disclosed by Affinito to have microparticles of barium titanate formed in a polymeric planarizing sublayer, as taught by Hora, in order to improve the device's efficiency while providing a planarizing layer, and to further

modify the particles of barium titanate to be less than about 5 microns across by using a readily available type of barium titanate particles, as taught by Harper, and to further modify the OLED to have pixels that are 300 microns across to provide a display with improved imaging, as taught by Fork, and thereby provide pixels that are larger than the microparticles contained in the polymeric layer.

7. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affinito (6,268,695) (of record) in view of Haluska et al. (4,849,296) as applied to claims 2-18, 21-27 and 31 above, further in view of Harper et al. (4,816,717) and further in view of Fork (6,339,289) (of record).

Affinito discloses an OLED having an active region (160) and a composite barrier layer having high-density sublayers and polymeric planarizing sublayers to shield the device from moisture and oxygen.

Affinito lacks disclosure of microparticles formed within the polymeric planarizing sublayers.

Haluska teaches that microparticles of titanium dioxide (Abstract) embedded in a polymeric planarizing layer of resin (Abstract) may be used as planarizing layers for electronic devices (Abstract).

Haluska fails to exemplify the size of the titanium dioxide particles.

Duggal teaches microparticles of titanium dioxide (page 3, paragraph 0036, lines 1-3) formed in a polymeric layer. Duggal teaches titanium dioxide microparticles that

have a mean particle size of 100 nanometers or less (10 microns) (page 3, paragraph 0036, lines 7-10).

Affinito, Haluska and Duggal lack disclosure of the pixel size of the OLED.

Fork teaches an OLED with pixels that are 300 microns across (column 5, line 9) as part of an OLED designed to prevent dark spots and thereby improve imaging.

Regarding claim 19, when such a pixel size taught by Fork is combined with the microparticle size taught by Duggal, the microparticles are smaller than the smallest lateral dimension of the pixel combination.

Regarding claim 20, the pixel size taught by Fork fits within the claimed pixel size range of 10 microns to 300 microns, and the microparticle size taught by Duggal fits within the claimed microparticle size range of 0.4 microns to 10 microns.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the OLED disclosed by Affinito to have microparticles of titanium dioxide formed in a polymeric planarizing sublayer, as taught by Haluska, in order to provide good protection of the electronic components while also providing a planarizing layer, and to further modify the particles of titanium dioxide to be less than about 10 microns across by using a readily available type of titanium dioxide particles, as taught by Duggal, and to further modify the OLED to have pixels that are 300 microns across to provide a display with improved imaging, as taught by Fork, and thereby provide pixels that are larger than the microparticles contained in the polymeric layer.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. If applicant wishes to review data on optical characteristics of metal oxides and polymers, the CRC Materials Science and Engineering Handbook, Third Edition 2001, Tables 304 and 306 may be of interest. If applicant wishes to review data on the optical characteristics of titanium oxide, the web site http://mineral.galleries.com/minerals/oxides/rutile/rutile.htm may be of interest. If applicant wishes to review data on optical characteristics of barium titanate, the attached GMELIN database printout and the web site http://www.china-raremetal.com/product/Barium%20%20Titanate%20(BaTiO3).htm may be of interest.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (571) 272-2455. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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